DOCUMENT RESUME

ED 266 184 TM 860 128

AUTHOR Holden, George W.
TITLE Studying Parental Decision Making with Micro-Computers: The CPSI Technique.
PUB DATE Aug 85
NOTE 15p.; Paper presented at the Annual Meeting of the American Psychological Association (93rd, Los Angeles, CA, August, 1985).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adults; *Child Rearing; Cognitive Processes; *Computer Oriented Programs; Computer Simulation; *Decision Making; Flow Charts; Heuristics; *Microcomputers; Parent Child Relationship; Parent Role; *Problem Solving; Research Methodology; Role Perception; *Social Cognition
IDENTIFIERS Computer Presented Social Interactions

ABSTRACT

A technique for studying how parents think, make decisions, and solve childrearing problems, Computer-Presented Social Interactions (CPSI), is described. Two studies involving CPSI are presented. The first study concerns a common parental cognitive task: causal analysis of an undesired behavior. The task was to diagnose the cause of non-contingent crying in an infant. The subjects were required to rule out causes of crying by acquiring the fewest and most important stored information units possible. The second type of problem, focused on decision making in a potentially difficult setting. The computer simulated the experience of shopping in the supermarket with a young child. As the computer reported that the child began to misbehave, the subject could select one of four or five pre-programmed responses. Subjects in both experiments were 120 middle-class, college educated women from two locations. In the first problem, mothers and pediatric nurses were more efficient and accurate at reaching a solution than women without children. In the second study, nulliparous, primiparous, and multiparous women showed differences in management techniques, but similarities in responses to child misbehavior. Further applications for the CPSI techniques are suggested. (LMO)

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Studying Parental Decision Making with Micro-Computers: The CPSI Technique

George W. Holden

Department of Psychology
University of Texas
Austin TX 78712

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Presented at the 93rd Annual Convention of the American Psychological Association at Los Angeles, August 1985.

TM 860 128

Studying parental decision making with micro-computers:
The CPSI technique

The contribution of parents to their children's development has long been recognized as a fundamental question in developmental psychology. What is only now beginning to be realized is that in order to fully understand the process of child development and the causes of parental behavior toward their children, psychologists must examine parents' thoughts and thinking. Why do parents act the way they do toward their children? What do parents think about when they are dealing with their children? Why do some parents have so much trouble solving common child-rearing problems? In order to address those and other related questions, a new approach and method for studying parental thinking has been adopted. This new approach is regarding parents as decision makers and problem solvers, and then studying them in that role with a novel technique.

This paper will begin with presenting the rationale for viewing parents as thinking individuals. Then, the new methodological technique that has been developed will be described. The technique involves using micro-computers, programmed with scenarios of social interactions, as the experimental stimulus. The scenarios are designed to elicit decision making and reasoning processes. Examples from the results of two initial studies that have already been completed will then be presented to illustrate some of the benefits of the new technique. Finally, some future applications, for both basic research and applied social problems, of this instrument and approach to studying parents will be suggested.

Background

Studies of parents have typically not viewed parents as thinking individuals, nor addressed many of the thoughts of parents (Parke, 1978). Although parental attitudes have been studied in the past, only over the past seven years have investigators devoted sustained attention to studying the content of other parental cognitions, such as perceptions, attributions, knowledge, and belief systems (e.g., see Sigel, 1985); practically no attention has been directed at studying process variables such as parental decision making and problem-solving.

A number of sources exist to support the view that parents, in general, devote a considerable amount of cognitive energy to their role as parent. Take the incidence of child-rearing problems, for example. Both the research literature (e.g., Achenbach & Edelbrock, 1981) and the popular literature (Salk, 1981) attest to the fact that most parents are faced with numerous child-rearing problems at many stages of development. The number of popular books counseling parents how to think about and deal with these problems provide evidence for the salience of this aspect of parenting. Given the frequency and prominence of child-rearing problems, it is surprising that few studies have been conducted concerning how parents think about and solve problems (e.g., Grusec & Kuczynski, 1979). Insights into how parents make decisions and solve problems would be useful to gain a better understanding how parents rear their children, and then could be used to aid parents in that task. In addition, there is some evidence to link erroneous parental thinking with child abuse. Some investigators (Azar, et al., 1984; Larrance and Twentyman, 1983) discovered that abusive parents have unrealistic expectations about their children, make inaccurate attributions, and are less likely to have flexible

problem-solving strategies. Thus, more research into the thinking of parents may well help parents who experience problems in the task of child rearing.

What is the best approach with which to study parental thinking? Social and cognitive psychologists have developed various constructs for their investigations into adult cognition, but they have yet to turn their attention to the study of parents. Parents are an ecologically valid population to study, as they are frequently required to make decisions under uncertainty (Kahneman, Slovic & Tversky, 1982), solve problems (Newell & Simon, 1972), and engage in social cognition (Fiske & Taylor, 1984) in their efforts in everyday parenting. Some of the heuristics involved in parental thinking, such as anchoring and availability have already been identified (Holden & West, 1983). Because parenting is, in part, a cognitive task, a cognitive decision making perspective is therefore an appropriate way to view and study parents.

Method

Investigators into parental cognitions have relied on either the interview or the questionnaire as a research methodology. Although these methods provide certain advantages, there are also certain potentially biasing factors. How can one accurately interview parents who are so invested in their offspring, and subject to the biases of evaluation apprehension, social desirability, and inaccurate recall? To avoid these and other methodological problems, this investigator has developed a new method, the CPSI technique or computer presented social interactions. The technique involves programming micro-computers to simulate or present social interaction situations and then have subjects interact with the computer.

There are a number of advantages afforded by this technique. By modeling a social interaction situation on the computer, the experimenter can create a well-defined situation where the problem space is similar to the task environment (Newell & Simon, 1972). This context specific environment provides a homogenizing effect across subjects, so that subjects begin their reasoning or decision making from the same starting point. A decrease in the likelihood of misinterpretation or misunderstanding of the task is one outcome. The CPSI technique allows the researcher to present a "closed system" in which subjects have to think and make decisions in a way not possible with an interview or questionnaire. Software can be written that is engaging and challenging for the subjects and which avoids the reflective mode of thought by forcing them to think and reason interactively with the computer. In addition, through interacting with the computer in the context of decision making or problem solving, "process" dependent variables in addition to "outcome" variables can be collected. Another advantage is that the subject can work alone and anonymously while interacting with the computer; the likelihood of social desirability biases is thus reduced (see Holden, 1985a for more information). A comparision of some of the other potential benefits as well as limitations of this technique with a standard interview or questionnaire method is presented in Table 1. The ratings are judgments based on theoretical capabilities of each method; the table is adapted from one developed by Dillman (1978).

An unlimited number of computer scenarios of social interactions can be developed to address different questions and examine different facets of parental thinking. For example, John Dewey, in 1910, described five "logically distinct" steps of problem solving. The steps occur in any problem solving task; the last two may be repeated in more complex situations. The steps were: 1) perplexity or doubt; 2)

identification of the problem; 3) research for facts; 4) formulations of the solution; and 5) testing of the solution. The CPSI technique could be used to study each of these five steps. Investigations into other aspects of parental thinking, e.g., perceptions of child behavior, attributions of intentionality, beliefs about children and attitudes toward parenting could also be investigated with social interaction scenarios presented by a computer. Furthermore, the technique could provide a more realistic and experimentally appropriate tool for the study of such constructs as parental heuristics and biases involved in their thinking (Kahneman, Slovic & Tversky, 1982) or parental scripts about child development (Abelson, 1981).

Two exploratory studies employing the method have been conducted. The first type of problem concerns a common parental cognitive task: causal analysis of an undesired behavior. The task was to diagnose the cause of non-contingent crying in an infant. The second type of problem dealt with a problem parents face with older children: making child management decisions in the supermarket. Previous work (Holden, 1983) indicated that parents are often required to make a series of child management decisions when taking children through the supermarket.

The Cry Problem

The Cry Problem actually involves two problem solving tasks, that of information search and then identification (or diagnosis) of the problem. These tasks correspond to Dewey's (1910) steps of "research for facts" and "formulation of the solution". The problem began with the information stem: "A baby was crying in her room, in her parents' home, at 10:30 in the morning". The subject was then told that there were nine possible causes of the crying (baby was wet, hungry, tired, etc.) but only one of the nine causes was correct. Twenty-five separate pieces of information were stored

in memory (e.g., the baby's age, what the cry sounded like, when the baby was last fed, etc.). By acquiring the right information units, a subject could rule out all but one of the causes. The task of the subject was to acquire the fewest and only the most important information units in order to determine the correct cause of the problem. A flow chart of the software is presented in Figure 1.

A number of dependent variables can be retrieved from the computer in order to examine the process by which subjects solved the problem. The number and types of information units acquired before selecting the correct cause, the number and types of incorrect causes selected, the subjects' path or trajectory through the information, and the relationship between the number of information units and the causes selected are examples of the dependent variables that can be analyzed immediately by the micro-computer.

The Supermarket Problem

The second type of problem, managing a young child in the supermarket, focused on decision making in that potentially difficult setting. This situation corresponded to Dewey's (1910) stages of formulating and testing solutions to problems. The program was developed to simulate the experience of shopping in the supermarket with a young child (see Holden, 1983). The 31 questions involved assessments of attitudes, planning decisions, use of management techniques and reactions to child misbehavior. The problem begins with a hypothetical story that a friend was sick and asked the subject to go shopping and take her son. The computer then simulates the child's behavior and describes the pair's progress through the store. At various times, the computer reports that the child has begun to misbehave (e.g., "What do you do when the child starts dropping groceries out of the cart?"). After each

question, the subject could select one of four or five pre-programmed responses, or type in an original response.

A Sampling of Results from the two Studies

A total of 120 middle-class, college educated women from two locations participated in the two studies. Thirty-five percent of the subjects had never used a computer before, but almost all of the subjects rated the computer-presented problems as "very easy" to use, "very interesting" and "quite enjoyable". Even for those individuals who had expressed initial anxiety about using the computer, after a few minutes they felt comfortable using the machine.

The first study (Holden, 1985b) involved diagnosing the causes of two problems, only one of which was related to infants. Four groups of 30 women with differing amounts of caregiving experience participated: nulliparous (inexperienced in infant caregiving), primiparous, and multiparous women, and (nulliparous) pediatric nurses. There were no group differences on the control problem (diagnosing why a woman had insomnia), but a number of differences on the problem concerning infant crying. As expected, the mothers and pediatric nurses were more efficient and accurate at solving the Cry Problem than were the women who did not have children. The mothers and nurses used fewer information units (8 vs. 11 units, $F[3, 119] = 3.17$, $p < .05$), and made fewer incorrect causal hypotheses than the nulliparous women (1.5 vs. 2, $F[3, 119] = 2.94$, $p < .05$). Group differences were especially revealing concerning which information unit was selected first. Sixty-three percent of the multiparous women, 47% of the pediatric nurses, 23% of the primiparous, but only 10% of the nulliparous women asked for information about the baby's age on their first information request.

In the second study (Holden, 1985c) involving the Supermarket Problem, three groups of women participated: nulliparous, primiparous, and multiparous women. A number of reliable differences emerged between the nulliparous women and the other two groups. For example, the nulliparous women thought shopping with children was more difficult, they were less confident in their abilities to manage a child, and they thought that they would be more embarrassed if the child misbehaved than did either of the maternal groups. There were also differences in the selection of certain management techniques: for example, 90% of the mothers chose to put the child in the shopping cart, but only about half the nulliparous women did ($\underline{X}^2$ [2, $\underline{n}$=88] = 13.97, $\underline{p} < .001$). Interestingly, there were few group differences concerning how they would respond to child misbehavior or in their rationale for making such decisions.

Conclusion

A novel use of micro-computers for the study of parents in developmental psychology has been described. In conjunction with viewing parents as decision-makers and problem-solvers, a different approach to examine parents is proposed. By programming micro-computers with scenarios of social interactions, data can be collected that was previously unaccessible or methodologically problematic. Two initial studies, testing two different problems, have been conducted and revealed a number of group differences between groups of women with differing amounts of experience with children.

This approach to the study of parents with the incorporation of micro-computers has a number of implications. Foremost, the use of micro-computer presented social interactions will be useful as a scientific instrument for collecting cognitive data; data

from not only parents, but adult and child cognition in general. By having subjects respond and react to actual situations and problems, albeit on a computer, a more veridical technique for assessing cognitions may be realized. Questions related to the cognition-behavior relationship could also be addressed with this new tool. For example, in what ways are individuals' performances to the simulated problems similar to how they would respond in real life?

A number of applications to social needs and problems can be developed with this technique. In the area of parent-child relations, two applications are apparent. First, software could be written to train parents or expectant parents in some of the knowledge and skills that are needed for effective parenting. As such, micro-computers could become a useful tool for parent education. Second, programs could be designed to be clinical tools for diagnosing parents who might be at risk for parenting problems, such as child abuse. By identifying individuals who might be prone to make inaccurate attributions, have unrealistic expectations or have limited problem-solving abilities, those parents could be helped in a remediation program before they experienced problems in their parental role. In these and other ways, the CPSI technique can provide a new methodological approach to address new questions in psychology and redress old problems in our society.

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Table 1. Ratings of the theoretical effectiveness of three research techniques for studying parental decision making

Criteria	Interview	Question-naire	CPSI
1. QUESTION CONSTRUCTION			
a. number of questions	***	**	***
b. allowable complexity	***	**	***
c. success with probes, open ended questions	***	*	**
d. success with controlling sequence	***	*	***
e. success with tedious questions	***	*	**
f. success in avoiding non-response	***	*	***
2. OBTAINING ACCURATE ANSWERS			
a. success in avoiding social desirability bias	*	**	**
b. success in avoiding experimenter bias	*	***	***
c. literacy requirement	***	**	**
3. ADMINISTRATIVE REQUIREMENTS			
a. potential speed of implementation	**	***	**
b. ease of data reduction and analysis	*	***	***
c. operating costs	*	***	** (after purchase)

Key: *** = method is good, strong or effective
** = method is adequate, medium or fair
* = method is weak, limited or poor

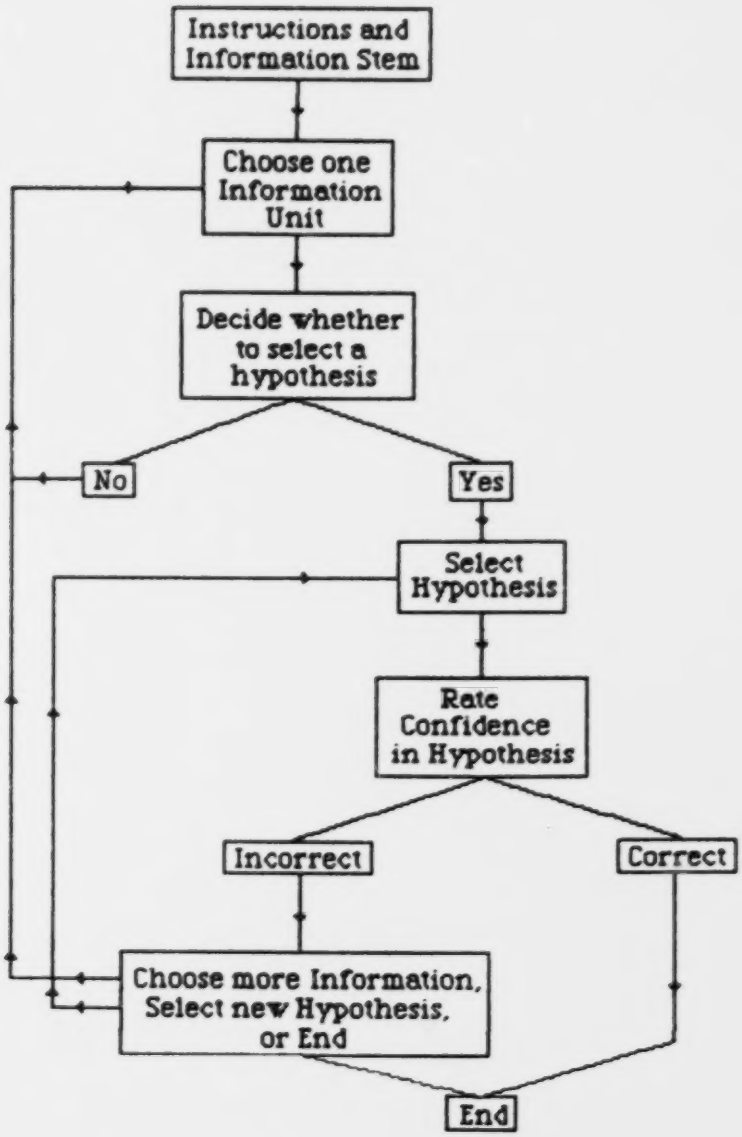

Figure 1. Flow chart of the Cry Problem